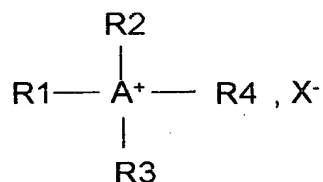


What is claimed is :

5 ~~1.~~ A compound of the general formula (I) below :

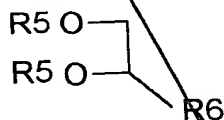
(1)



Wherein A is a phosphorus or an arsenic atom; X⁻ is an anion; and wherein R1 is selected from the group consisting of :

15 a) the radical of formula (II) below :

(11)



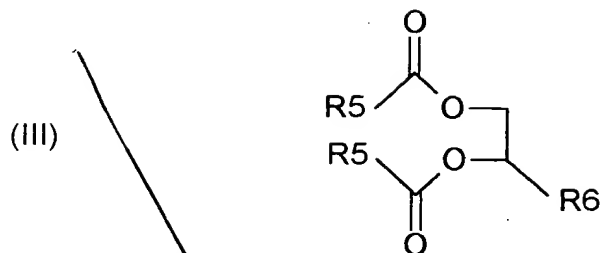
wherein R5 represents a lipid moiety and R6 is a linear or branched alkyl chain from 1 to 4 carbon atoms,

25 Provided that R2, R3 and R4 of formula (I) represent each a methyl group;

b) the radical of formula (III) below :

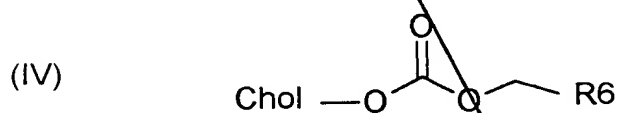
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Category	Sub-category	Value	Unit
Energy	Electricity	1.2	kWh
	Gas	0.8	kWh
	Oil	0.5	kWh
	Coal	0.3	kWh
	Renewable	0.1	kWh
	Other	0.05	kWh
	Transport	0.2	kWh
	Buildings	0.1	kWh
	Industry	0.05	kWh
	Services	0.05	kWh
Water	Drinking	1.5	m³
	Industrial	0.8	m³
	Agriculture	0.5	m³
	Domestic	0.3	m³
	Commercial	0.2	m³
	Public	0.1	m³
	Health	0.05	m³
	Education	0.05	m³
	Government	0.05	m³
	Other	0.05	m³
Waste	Household	1.0	kg
	Industrial	0.5	kg
	Commercial	0.3	kg
	Public	0.2	kg
	Health	0.1	kg
	Education	0.05	kg
	Government	0.05	kg
	Other	0.05	kg
	Recycling	0.5	kg
	Landfill	0.5	kg



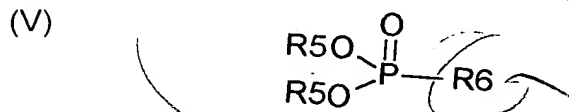
wherein R5 represents a lipid moiety and R6 is a linear or branched alkyl chain from 1 to 4 carbon atoms, provided that R2, R3 and R4 of formula (I) represent each a methyl group;

c) the radical of formula (IV) below :



wherein Chol means a cholesteryl radical and R6 is a linear or branched alkyl chain from 1 to 4 carbon atoms, provided that R2 and R3 of formula (I) represent each a methyl group; and

d) the radical of formula (V) below :



wherein R5 represents a lipid moiety and R6 is a linear or branched alkyl chain from 1 to 4 carbon atoms,

provided that R2 and R4 are alkyl chains from 1 to 4 carbon atoms; and

5 R3 is selected from the group consisting of:

- an alkyl chain as defined for R2 and R4,
- the functional group $\text{CH}_2\text{-CH}_2\text{-P}^+(\text{R6R7R8})$, wherein R6, R7 and R8 have the same meaning as R2 and R4; and
- $\text{CH}_2\text{-CO}_2\text{R9}$, wherein R9 has the same meaning as R2.

10

2. The compound of claim 1, wherein the anion X is selected from the group consisting of an halide, CF_3SO_3^- , CF_3CO_2^- or HSO_4^- .

3. The compound of claim 2, wherein the halide is selected from the group consisting of Cl^- , Br^- and I^- .

15

4. The compound of claim 1, wherein the R5 lipid moiety is selected from the group consisting of :

- (i) an alkyl or an alkenyl chain containing from 10 to 22 carbon atoms comprising 0, 1 or 2 olefinic double bonds,
- (ii) a cholesteryl derivative
- (iii) a perfluoro alkyl chain from 10 to 22 carbon atoms.

20

5. The compound of claim 1, wherein the R5 lipid moiety is selected from the group consisting of $\text{C}_{14:0}$, $\text{C}_{18:1}$, $\text{C}_{18:2}$; $\text{C}_{15:0}$, $\text{C}_{17:0}$, $\text{C}_{17:1}$, $\text{C}_{17:2}$, wherein the first number designates the number of carbon atoms and the second number designates the number of double bonds.

25

6 The compound of claim 1, wherein R1 is of formula V and R2 and R4 represent each independently a radical selected from the group

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consisting of CH_3 , C_2H_5 , $n\text{C}_3\text{H}_7$, $\text{iso-C}_3\text{H}_7$, with n being an integer equal to 1, 2 or 3

7. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkyl chain and R6 is a methyl group.

8. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkenyl chain and R6 is a methyl group.

9. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkyl chain and R6 is an ethyl group.

10. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkenyl chain and R6 is an ethyl group.

11. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkyl chain and R6 is a propyl group

12. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of an alkenyl chain and R6 is a propyl group

13. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of a cholesteryl $-\text{[C(O)N-CH}_2\text{-CH}_2\text{-O]}$ group
and R6 is an ethyl group.

14. The compound of claim 1 wherein R1 has the formula (II), (III) or (V),
the R5 lipid moiety consists of a perfluoroalkyl chain R6 is an ethyl
group.

15. The compound of claim 1 wherein R1 has the formula (II), (III) or (V), the R5 lipid moiety consists of an oleoyl chain ($C_{17}H_{33}C(O)O$) and R6 is a propylen group.

5 16. A compound according to claim 1 wherein R1 has the formula (II), (III) or (V), the R5 lipid moiety consists of an oleyl chain ($C_{18}H_{35}$) and R6 is a -1,2 deoxyglycerol group.

10 17. The compound of claim 1 wherein R1 has the formula (II), (III) or (V), the R5 lipid moiety consists of a cholesteryl group and R6 is a $[C(O)O-CH_2-CH_2-]$ group.

15 18. A vesicle comprising the compound according to ~~any one of claims 1 to 17.~~ ^{Claim 1}

19. A vesicle consisting essentially of a compound according to any one of claims 1 to 17.

20 20. The vesicle of claim 18, which is a small unilamellar vesicle.

21. The vesicle of claim 18, which is a multilamellar vesicle.

22. A method for introducing *in vitro* a nucleic acid in a cell host comprising the steps of:

a) incubating said nucleic acid with a compound according to ~~any one of claims 1 to 17~~ ^{Claim 1} to obtain complexes formed between said nucleic acid and said compound; and

b) incubating the cell host with the complexes obtained at step a).

23. The method of claim 22, wherein the compound is under the form of unilamellar vesicles.

24. A method for introducing in vivo a nucleic acid in cells of an host organism comprising the steps of :

a) incubating said nucleic acid with a compound according to ~~any one of claims 1 to 17~~ to obtain complexes formed between said nucleic acid and said compound; and

b) administering the complexes obtained at step a) to said host organism.

25. The method of claim 24, wherein the organism is a mammal.

26. A complex formed between a nucleic acid and a compound according to any one of claims 1 to 17.

27. The complex of claim 26, wherein the nucleic acid comprises a polynucleotide encoding a polypeptide.

28. The complex of claim 26, wherein the nucleic acid comprises a polynucleotide which encodes an antisense polynucleotide.

29. The complex of claim 26, wherein the polynucleotide encoding a polypeptide is operably linked to a regulatory sequence.

30. A composition comprising a complex according to ~~any one of claims 26 to 29~~.

31. A pharmaceutical composition comprising a complex according to any one of claims 26 to 29.

claim 1

claim 26

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11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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